

國立中央大學 109 學年度碩士班考試入學試題

所別： 土木工程學系 碩士班 運輸工程組(一般生)
土木工程學系 碩士班 運輸工程組(在職生)

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科目： 運輸工程

*計算題需計算過程，無計算過程者不予計分

本科考試可使用計算器，廠牌、功能不拘

*請在答案卷(卡)內作答

Transportation Engineering

Total score: 100%

Note: You can write your answers in Chinese or English. For the first five problems, please write down your calculation procedures instead of answers only. Note that $g = 9.81 \text{ m/sec}^2$.

Problem 1 (10%): Given a corridor of 10m wide in a railway station, a peak demand of 800 pedestrians per minute, and an average walk speed of 1.2 m/s for passengers, please estimate the level of service (LOS) at the corridor.

LOS	A	B	C	D	E	F
space (m^2/ped)	> 3	> 2~3	> 1~2	> 0.8~1	> 0.7~0.8	≤ 0.7

Problem 2 (15%): Given an intersection width of 13.5 m, a vehicle length of 4.5 m, a perception-reaction time of 1 second, and a comfortable deceleration of 2.25 m/sec^2 ; what is the speed that the amber time (τ) attains a minimum to avoid a dilemma zone? What is τ_{\min} ?

Problem 3 (20%): The following information is given: a perception-reaction time of 1 second, a coefficient of friction of 0.25, a letter size of 30 cm, and a level freeway. Suppose that the design driver can read a sign from a distance of 5 m for each 2.5 cm of letter height. Please determine how far away, from an exit ramp, a directional sign should be located to allow a safe reduction of speed from 100 km/hour to 30 km/hour.

Problem 4 (20%): If a 600 m vertical curve connects a +4% grade to a -2% grade at station 50+00 with an elevation of 500 m for the VPI (vertical point of intersection), please calculate the elevations at the VPC (vertical point of curvature), the VPT (vertical point of tangent), and the highest point.

Problem 5 (20%): The following table contains the information of signals at intersections of a one-way street. If the vehicles travel at 45 km/hour, what is the through band?

Intersection	Green	Amber	Red	Offset	Distance from A
A (unsignalized)					0m
B	35s	5s	40s	0s	400m
C	45s	5s	30s	30s	900m
D	35s	5s	40s	20s	1700m

Problem 6 (15%): Answer the following questions:

- (a) (5%) What is channelization used for? Please show an example of channelization.
- (b) (5%) What is intermodal transportation and its advantages?
- (c) (5%) What is carpooling and its advantages?

參考用